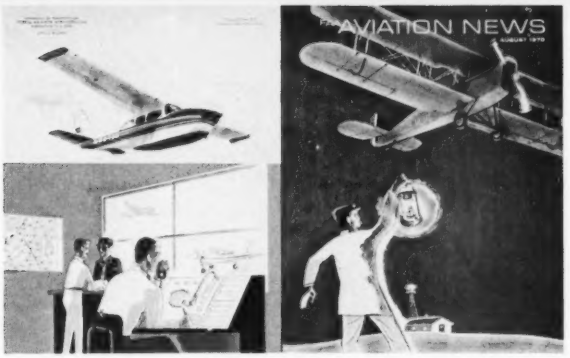
FAA AVIATION NEWS

AUGUST 1970



COVER

Flight service stations have chalked up a half-century of dedicated efforts to make flying safe. For the fascinating history of the pilot's best friend, see page 7.

FAA AVIATION NEWS

DEPARTMENT OF TRANSPORTATION / **FEDERAL AVIATION ADMINISTRATION** VOL. 9, NO. 4

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FAA AVIATION NEWS is published by the Office of Public Affairs, PA-20, Federal Aviation Administration, Washington, D. C. 20590, in the interest of aviation safety and to acquaint readers with the policies and programs of the agency. The use of funds for printing FAA AVIATION NEWS was approved by the Director of the Bureau of the Budget, July 14, 1967. Send change of address to the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, with a mailing label from any recent issue. Single copies of FAA AVIATION NEWS may be purchased from the Superintendent of Documents for 20 cents each. All printed materials contained herein are advisory or informational in nature and should not be construed as having any regulatory effect. The FAA does not officially endorse any goods, services, materials, or products of manufacturers.

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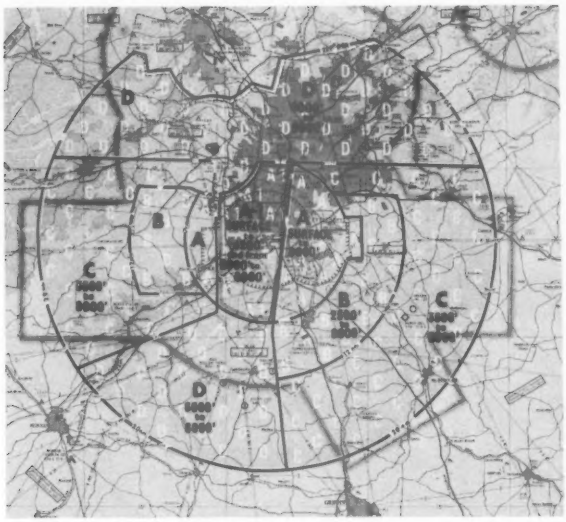
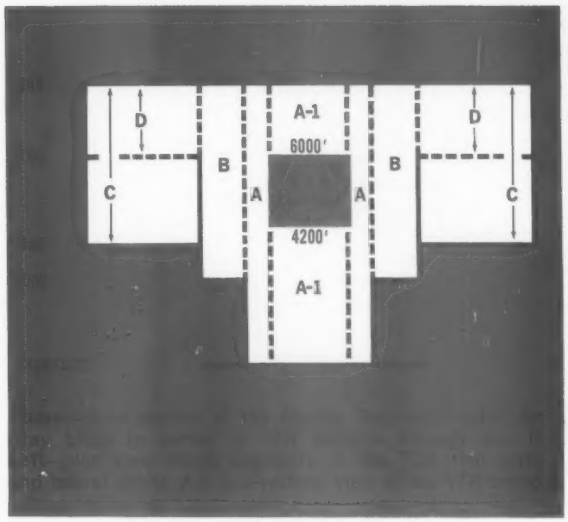




TCA and the VFR Pilot

High density airports across the nation will soon be operating under the new Terminal Control Area (TCA) regulation, amended FAR Part 91. The rule is already in effect at Atlanta and will be extended to Washington, D.C., Chicago and about 20 other aviation hubs. TCA will not bar VFR flight from major terminals, as some have feared, nor interfere with access to general aviation airports underlying the Terminal Control Area of a large airport.

The Terminal Control Areas are:

Group I

Atlanta —	Effective date	6/25/70
Washington —	" "	7/23/70
Chicago —	" "	7/23/70

Boston; Dallas; JFK International; LaGuardia; Los Angeles; Miami; San Francisco

**Group II*

Cincinnati; Cleveland; Denver; Detroit; Houston; Kansas City; Las Vegas; Minneapolis; Newark; New Orleans; Philadelphia; Pittsburgh; Seattle; and St. Louis.

* Tentative locations

For Group I Areas all aircraft will require two-way radio, a transponder and VOR or TACAN equipment on board—(except for helicopters); the operator must have at least a private pilot's certificate. At Group II TCAs a student pilot permit will do; VFR aircraft need no transponder. Responsibility for having appropriate equipment and qualifications rests with the pilot, who must seek an Air Traffic Control clearance before operating in the Area. No ATC approval is required for planes that *remain within the special VFR corridor provided for general aviation.*

These VFR corridors, about four miles wide and with a floor-to-ceiling height of about 2,000 feet, are specifically designed to afford free access to the satellite airports of a high density terminal area while at the same time effecting the separation of light aircraft from large jets. The corridor will be open to all aircraft (including those flown by student pilots), except large jets; airspeed will be limited to 200 knots. Most, but not all, TCAs will have VFR corridors. Chicago is one of the exceptions.

First city to operate under TCA was Atlanta, beginning on June 25, 1970. Pertinent information for pilots, as well as a diagram of the area, was published in the current Airman's Information Manual. A *VFR Terminal Area Chart* for Atlanta, replacing the old local chart, has also been published for FAA by the U.S. Coast & Geodetic Survey and is available for 40 cents at Flight Service Stations or from the Department of Commerce. Sector approach control frequencies are printed on the chart.

The chart shows the Atlanta Terminal Control Area as extending from the ground up to 8,000 feet MLS, with a maximum diameter at the upper level of about 45 miles, tapering down to about 17 miles at the base. The VFR corridor, about four miles wide and 15 miles long, extends from 4,200 to 6,000 feet MSL. Aircraft operating through the corridor on a course from 0 to 179 degrees are required to fly at 5,500 feet; all others should be at 4,500 feet in transit. Responsibility will rest with each pilot in the corridor for navigating clear of the TCA's positive control area and for remaining legally VFR. On request, radar advisory information will be given, on a workload permitting basis.

Individual Notices of Proposed Rulemaking will be issued for each of the remaining proposed Terminal Control Areas, and details of the local design will be worked out with the aviation community. ■

VFR TRAFFIC

1. **Flight Plans.** Not required. For aircraft inbound to the primary airport, ATC should be contacted on listed frequency prior to entering TCA. On departure, give intended exit route and altitude to ground control. When using airports in the TCA other than the primary airport, operate in the VFR corridor when ever possible.
2. **Through Flights.** TCA clearances will be issued on a traffic-permitting basis to transiting aircraft, VFR and IFR alike.
3. **Radio failure within TCA.** Continue with landing or departure according to latest clearance. If outside of TCA, do not enter.
4. **Weather deterioration.** If you cannot comply with a TCA clearance and remain VFR because of worsening weather, notify air traffic control.
5. **In-flight transponder failure on arrival.** You are allowed to continue according to clearance; notify ATC. If the transponder cannot be repaired after landing, you will be permitted to continue.
6. **Priority within TCA.** None. All traffic: first come, first served.

Little Towers with BIG EARS

When line of sight communication fails, check the chart for nearest remote receiver. It may be right under your nose.

A half hour out of Martinsburg (W. Va.) the pilot began to worry. He had filed VFR for Morgantown, a scant 100 miles to the west, and the weather had looked passable with only a few scattered clouds. But the cloud cover had thickened as he passed over the first range of hills, and the ceiling had lowered to about 5,000 feet. Maintaining a barely legal 4,500 he was unpleasantly close to the 3,000 foot ridges slanting across his flight path. He was locked in on the Grantsville VOR and had no problems about navigation, but the air was getting turbulent, with sharp up and down currents, and if it got any worse between here and Morgantown—well, he could use a little advice. Maybe the weather was better up ahead—*famous last words.* He tried to raise the flight service station again.

"Morgantown Radio, this is Bonanza 712 Whiskey inbound for the airport. I'm approaching the Grantsville VOR . . . Over."

Still no reply. He checked the frequency on the chart with the selection on his instrument: 122.3, no mistake there. He turned the gain on the receiver up to full and kept on calling without an answer. Then he forced himself to stop and consider rationally what the problem might be.

Had there been a recent frequency change for Morgantown FSS on a NOTAM he had missed? Not likely. The people at Martinsburg FSS where he filed his flight plan would surely have told him about it.

Had his radio failed en route? Not likely either, since the VOR signal was still coming in steadily. In fact, the To—From flag had just flipped over, and he had spotted the Grantsville VOR on the mountaintop uncomfortably close to him under the left wing tip.

What else? The only reasonable answer he could think of was that, given the relatively low elevation of Morgantown (1,248 feet)) and the height of the intervening Allegheny mountain range, his present altitude was simply not high enough for line of sight communication with the FSS. The same would be true of Martinsburg, so there was no point in switching frequencies.

What should he do? Climbing high enough to raise the station probably meant going solidly into the clouds—for him, an illegal move and possibly a fatal one, given his lack of experience on instruments. Pushing on to Morgantown in the face of apparently deteriorating weather did not seem like a good idea either. He could turn back or—what else? He could hold over the Grantsville VOR for 20 minutes or so until the next (quarter past the hour) weather broadcast came on.

Looking at the VOR again he was suddenly struck with a thought: *don't some of them have remote communications tied in with the NAVAID?* He examined the chart, and sure enough, right above the Grantsville box was the notation 122.1R.

After a moment of indecision as to whether it means that *he* or the station could receive on 122.1, he changed his communications radio to the frequency and called Morgantown again.

He was acknowledged at once, with an amplified voice that nearly blasted him out of the cabin. He was informed that VFR conditions were holding and improving near the airport. He felt encouraged to complete his flight, which he did without incident. A near crisis in the air had been averted for this VFR pilot because he had recalled a brief notation on the chart that many have ignored.

There are literally thousands of flyers who do not realize that the voice and the ears of a flight service station are not necessarily limited in range by line of sight or maximum distance. The FSS is primarily a communications center, with telephone links to VORs, remote control outlets, control towers and air route radar traffic control centers. A small aircraft lost above the West Virginia hills can be located with radar by a controller sitting at a scope several hundred miles away in Cleveland, who has been alerted by a FSS specialist in Morgantown. The latter would receive the original contact via a telephone line to a remote mountain top radio receiver near the distressed plane. In any emergency, particularly in mountainous or sparsely settled country, it is vitally important for all pilots to know how to use the established communications network to keep in touch with FAA's air traffic service.

Flight service stations have two kinds of remote control outlets. The "limited" outlet is co-located with VORs or VORTACs, and is indicated simply by the frequency number plus the letter R (for receive) after it. Sitting at his desk many miles away, the FSS specialist can transmit on the same frequency as the NAVAID, simultaneously (except when taped voiced messages are being given), but he must receive on a distinct frequency. The MAYDAY emergency frequency is also guarded by remote outlets, but not by the limited remote outlets where NAVAIDs exist. Its use should be limited to genuine emergencies.

Remote control outlets from flight service stations are also located apart from NAVAIDs in some areas. Such outlets have a simplex system, which means they can send and receive on the same frequency, usually identical with local FSS frequencies. Incidentally, many FSSs have more than one transceiving frequency, as indicated directly over the rectangular box giving the local VOR frequency. It is important to know that FSS frequencies are not shown on the charts near the phrase FSS, but are always shown outside of the VOR box (on the new charts only; on the old charts the FSS frequencies are only given in the data printed on the reverse side).

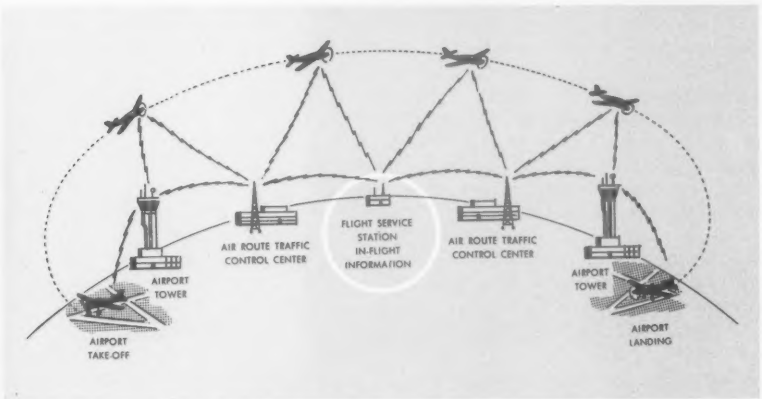
On all frequencies except 121.5, pilots should take the time to listen before transmitting. If the line is busy, wait for the end of a transmission, or try an alternate frequency. Jammed lines mean tiresome delays for everyone concerned.

When calling in on remote frequency, give your location and the frequency you are listening on (. . . *five miles east of Grantsville VOR, listening on 122.3*, etc.). Since some FSSs have several frequencies, the responding specialist would have to guess at the one you are guarding unless you informed him. Your exact location is important because in the event of a weak signal the specialist might want to ask another FSS to contact you, or otherwise utilize the resources of the air traffic service to assist you.

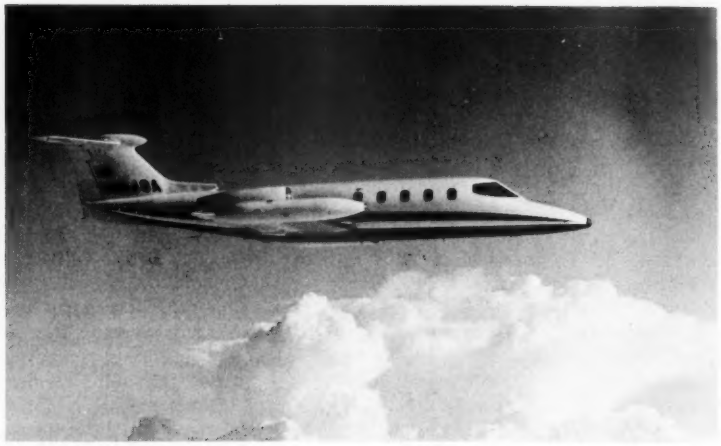
Over the 50 years span of its history the flight service station has become part of one of the most comprehensive communication systems in the world, at the service of every pilot; but access to the system calls for some understanding of how and where and why it works. ■

An excellent film on communications for private pilots will soon be available from FAA. Write to Film Library, AC-921, FAA, P.O. Box 25082, Oklahoma City, Oklahoma 73125, requesting "Basic Radio Procedures for Pilots".

Left — FAA maintenance technician monitors land phone line in VOR transmitter near Martinsburg, Va. Right — the familiar "witches cap" identifies the VOR or VORTAC (with distance measuring equipment) for the airborne pilot.



On a cross country flight, the FSS provides a radio link with the ATC system.



Above—Denver GADO inspector Al Crook points to angle-of-attack sensor during preflight walkaround with instructors. **Right**—through cooperation with Gates Aviation, the Colorado instructors were able to take familiarization rides in the company's Lear and Falcon jets.

The Colorado Story

Colorado flight instructors form a "Co-Op" that enables the impecunious pilot to gain experience in high performance aircraft.

Flight instructors, long known for their independent thinking, have banded together in Colorado to further the cause of safe flight. They are reaping economic benefits in the process.

Picture, if you will, a young flight instructor on a sparse budget flying jet aircraft and helicopters just for practice. Impossible, you say? Not if he belongs to the Colorado Flight Instructor Association.

About four years ago, Robert Wilson, a young flight instructor freshly certificated and encouraged by the Denver GADO, helped organize the association and became its first president. He believed strongly in the need for broader instructor flying experience as a means of raising the standards of flight instruction.

Membership in the CFIA includes airline pilots, executive pilots, fixed base operators, free lance operators, and at present seven women flight instructors who are active in the profession. Any flight instructor in Colorado may join the CFIA by paying an initiation fee of $2.50 plus annual dues of $5.

Headquartered in Denver, the association holds regular monthly meetings where guest speakers are invited to talk on timely subjects. FAA inspectors from the Denver GADO review recent changes to pertinent FARs and proposed rule changes. Other subjects range from a discussion of flight fees to salesmanship or advanced aerodynamics.

In addition to the regular meetings, a special training session is held on the third Friday of each month to update and broaden the instructors' technical knowledge. For example, last January was designated "check-out month" in a complex single engine aircraft. In this case, a Piper Comanche was used. This may draw a few raised eyebrows from veteran pilots, but when one considers that many young instructors have very limited flight experience in aircraft other than simple trainers, the Comanche is indeed a complex aircraft.

Members desiring a check out were required to attend a ground school on a convenient evening where performance specifications, operating limitations, and emergency procedures for the Comanche were covered in detail by veteran instructors. Next morning, the ground school "graduates" were eligible for a check ride in the aircraft at cost. Aircraft were furnished by local companies affiliated with the association.

The month of February was slated as helicopter familiarization month. Again, an evening ground school was held by veteran helicopter instructors who outlined the principles of helicopter operations. On the following morning, attendees reported to Jefferson County Airport, just north of Denver, where local operators had assembled every possible make and model of helicopter. Each instructor was given a brief familiarization ride free of cost. Some became enthused and enrolled on the spot for further helicopter flight training.

March was designated as turbo-prop month. At the evening training session, chief pilot Ken Moe of Mountain States Telephone Company lectured on turbo-prop operations. The next day, through the courtesy of the telephone company, the instructors were assembled into groups of five and taken for short familiarization flights with each instructor getting a few minutes at the controls.

April was designated as pure-jet month. At this session, chief pilot Glen Nash of Gates Aviation lectured and used his company's Falcon and Lear Jets as ground models. Because of the relatively high hourly flight costs, it was not possible to take everyone for a ride. However, several instructors were subsequently taken along as cockpit observers on executive flights.

United Air Lines and Frontier Airlines joined in and offered free observer rides to selected flight instructors on their local training flights. As a result, rapport between instructors and airline pilots has improved and there are fewer complaints concerning conflicting traffic between the "super giants" and the "super cubs." Pilots are able to discuss mutual problems and reach amicable understandings as regards co-use of the airspace.

As one instructor put it, "the runway looks a lot different when you're approaching it at 200 knots. You don't have much time to maneuver." A 60-year-old instructor pilot examiner who had never had a chance to fly jets, came back grinning and remarked, "This is the biggest thrill since I first soloed!"

In the absence of a state aeronautical authority, the Colorado Flight Instructors Association has demonstrated what local initiative can do to upgrade flight instruction. FAA's inspectors at the Denver GADO are much impressed with the higher qualifications of recent candidates for instructor certificates who have taken advantage of the training provided by CFIA.

Robert H. Lewis
Denver GADO

Like the celebrated daring young man on the flying trapeze, the airplane pilot appears to fly through the air with the greatest of ease, unfettered by earthly ties. It is not so. Successful flight has always depended heavily on people on the ground who provide vital weather information and navigational guidance.

Today's pilot has access to an extensive range of weather data as well as electronic "sign posts" which help guide him safely toward his destination. Help, in any emergency, is rarely farther away than the microphone at his hand. Even if it is only to learn the wind direction on the airport, the active runway, or the availability of repairs and fuel, most pilots regularly seek help from someone on the ground. Today, this assistance may often be more a matter of convenience than necessity. But in the early days of cross country flight it was often a matter of life and death.

Long distance air transportation began more than 50 years ago in the United States, when the Post Office Department opened the Transcontinental Airway between New York to San Francisco. The aircraft, open cockpit biplanes, were primitive by today's standards; instrument navigation was crude or non-existent; and the compensation was as meager as the risks were great—31 out of the first 40 airmail pilots were killed between 1920 and 1926.

From the very beginning it was apparent that if the pilots—and transcontinental air service—were to survive, some form of ground based assistance must be provided to assemble weather data for pilots prior to take off, and to guide them safely down to the airfield on arrival. Accordingly, each of the 17 airfields linking up the Transcontinental Airway was provided with a radio station and an operator/caretaker. This was the foundation of the modern flight service station, whose 50th anniversary is being celebrated on August 20, 1970. This article is an historical salute to the heroes of aviation who manned these stations over the past half century.

The Post Office Department had been working on the idea of an air mail service since May 15, 1918 when the first trial route was opened along a 218-mile-long path linking Washington, D. C., Philadelphia, and New York. The War Department supplied planes, pilots, maintenance crews and facilities for the route, and flew one round trip a day except Sunday. Despite the sketchy communication system and the primitive state of aircraft development, the Washington-Philadelphia-New York line built up a reputation for dependability, often flying in weather that would be below safe minimums by modern standards.

On July 1, 1918, the Post Office established a combination rail/air mail route between New York and Chicago. Mail destined for the Middle West and the West Coast would be loaded aboard an early morning flight out of New York. The aircraft would arrive at Cleveland at nightfall, whereupon the mail would be swiftly transferred to a Chicago-bound train that had left New York the *night before*, thus saving about 16 hours to the Middle West. On eastbound trips mail was flown from Chicago at dawn to overtake the night mail train at Cleveland, which reached New York at 9:40 the following morning.

Encouraged by the time saving, on August 12, 1918, the Post Office went into the air mail business in earnest. The Army turned over its mail-carrying aircraft to the Post Office and pilots and mechanics became postal employees.

The transcontinental route was extended westward to Iowa City, Omaha, and North Platte; to Cheyenne and across Wyoming via Rawlins and Rock Springs to Salt Lake

City; to Elko (Nevada) and Reno; and on to Oakland and the pearl of the Golden Gate—San Francisco. The Chicago to New York segment included field stations at New Brunswick, N. J.; Bellefonte, Pa.; Cleveland and Bryan, Ohio; and Washington, D. C. Four of these original stations (Washington, Salt Lake, Elko and Rock Springs) have been in continuous operation ever since.

By August 20, 1920 a string of 17 airway radio stations were authorized. In a few weeks the air mail was flowing across the continent. The nation soon had a workable and, surprisingly, dependable cross country air mail route. The press also had a new national herb-type; the air mail pilot, a swashbuckling, booted, helmeted daredevil with wings.

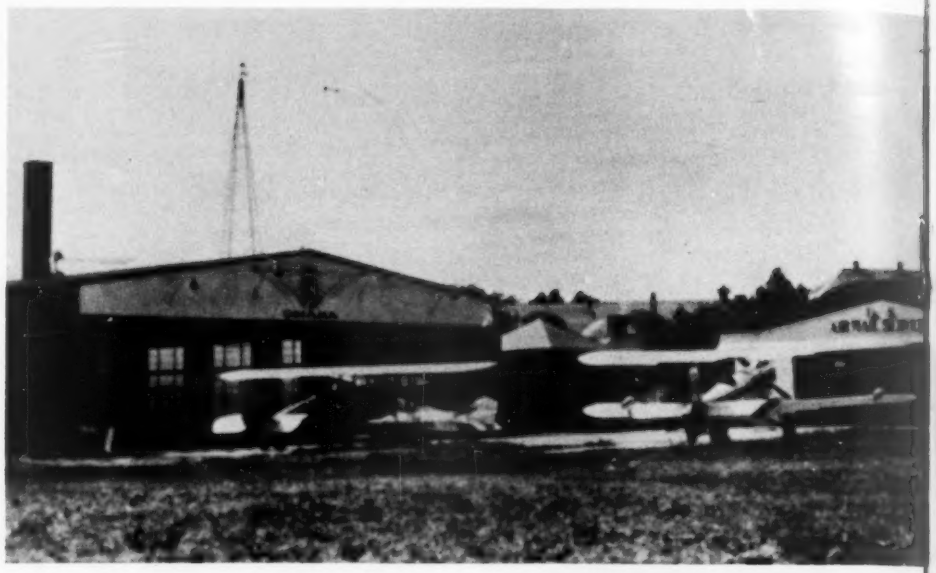
Ground Radio Only

Life support for this winged daredevil was provided by the airway radio station, staffed by a lone operator who worked seven days a week and stood split shifts to accommodate the dawn departure-dusk arrival schedule of the mail planes. The typical operator rose at 4:30 a.m. and began preparations for the morning flight by radioing checkpoints along the route for weather reports. At the same time he would report his local conditions to other callers up and down the line.

Radio telegraphy was used exclusively, being cheaper than leased wire telegraphy and more dependable than voice radio. Except for experimental work, no radio communications in the early Twenties were air to ground. The earliest equipment consisted of spark transmitters, later replaced by 2KW arc transmitters, operating on wave lengths between 2,500 and 4,000 meters. During "heavy" atmospheric conditions signals sometimes failed to get through, and ingenious operators modified the equipment to increase the power and range. More ambitious operators experimented with vacuum tube transmitters on short wave. The modifications were generally made with materials scrounged locally from junked aircraft by the station operator and the work was done in his spare time, without remuneration. The driving force was the operator's concern for getting the information needed to protect his pilots.

Acceptable transmission speed for the "CW" Morse code was 30 words per minute, but 40 to 45 words was not uncommon and some operators were so nimble with the key that their transmission speed was limited only by the ability of the receiver to copy wordage gushing out of the instrument. Additional intelligence was crammed into the message by use of Philips code abbreviations.

The station operator made his own weather observations and forecasts, including estimated cloud ceiling, temperature, visibility, windspeed and direction, and field conditions. Additional nearby weather ob-



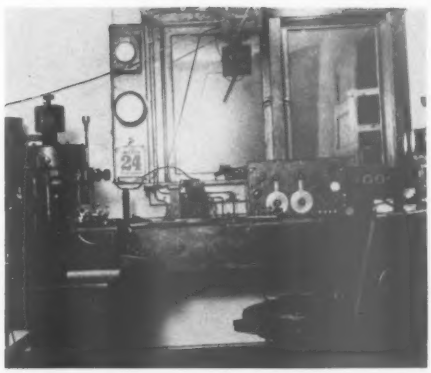
Spindly antennas, many of them adapted from mail order windmill towers, were typical of the do-it-yourself ingenuity of early-day flight service station specialists. In spite of crude equipment, radio communications of 600 miles and more were commonplace.

Right—demands for night flying speeded research for an efficient field lighting system. This portable Navy light, which was used in the airmail service, produced one-half billion candlepower. Portable, including generators, the lights turned pastures into airfields.

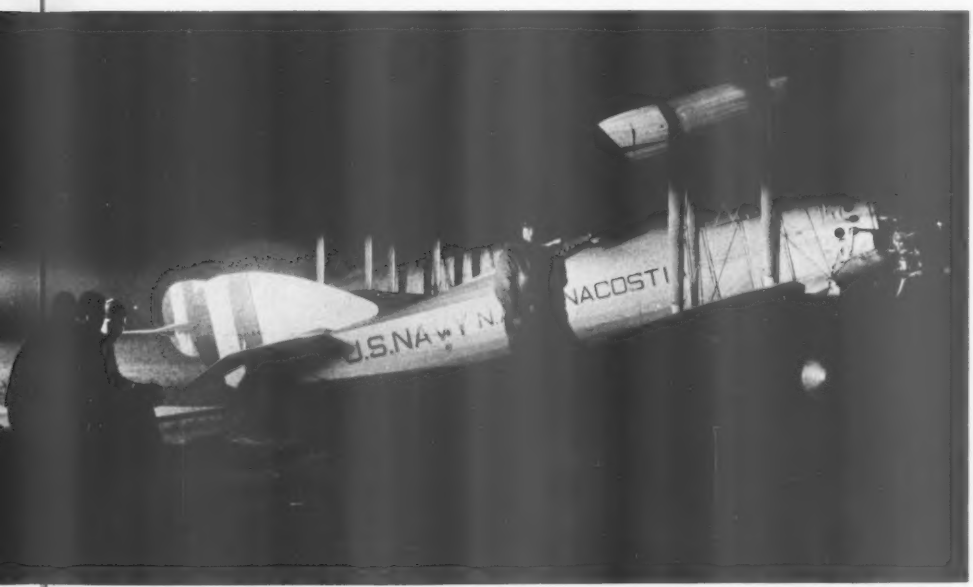
Above—North Platte, Neb., radio station, like many of the early FSSs, was housed in a building ordered from a mail order firm.

Left—Sam Kelly, the operator-in-charge, Herb Woodington and Stan Hutton, manned the FSS at Rock Springs, Wyo., in 1929.

This Overseas Foreign Aeronautical Communications Station at Everett, Wash., in the early '40s was the forerunner of the present International Flight Service Station. The FAA now has nine IFSSs providing virtual instant communications anywhere in the world.



Famed 2KW arc transmitter at Salt Lake City is the type used in earliest FSSs. The handle at the top is the wave length selector. Cylindrical object at left is the water-cooled arc chamber. "CW" key or 'bug" can be seen immediately in front of the receiver.



Low frequency "loop" radio range. This type was developed in the late '20s and was non-simultaneous; that is, the range had to be shut down during voice transmissions. This resulted in a temporary loss of navigation guidance in pilots flying on the radio beam.

servations were phoned in to him by part-time weather observers. At best, the weather "map" so produced consisted of a narrow swath from one station to the next, with little information on adjacent storm systems. The pilots, after landing, would pass on to the station operator their inflight weather observations (forerunner of the modern PIREP).

When the radio was not transmitting aeronautical information the lines were open for other government business. Department of Agriculture reports showed market conditions in Cincinnati, Chicago, Kansas City and Omaha. Party-line gossip and neighborly messages also found their way into the system, linking all participants into a kind of family relationship.

By 8:30 in the morning the station operator would usually have completed all his calls and gotten his pilot off the ground, shooing stray cattle off of the airstrip when necessary, helping sort and stow the mail and seeing to supplies. He was then free until about 4:30 in the afternoon, when he stood a second four hour shift, servicing the arriving daylight flight, and the departing night flight (day/night flights were inaugurated on February 22, 1921, *see page 12*). If a landing in darkness or poor visibility was anticipated he prepared to light the airfield with the best means at hand—automobile headlights, oil drums, flares, etc. Snow drifts often had to be cleared from the runway and runway edges frequently needed delineation in the form of lighted markers. If field conditions were too poor for a safe landing, the station operator had to warn the pilot, using pre-arranged field or hand signals. Many long and lonely hours of the night were spent sitting around waiting anxiously for the husky roar of a Liberty engine . . . that sometimes never came.

All Work and Little Pay

The typical starting salary for an early day station attendant was $1,200 a year, with modest raises and plenty of overtime—unpaid. (By comparion, the pilots earned a base pay of $2,000 a year, plus a 5-6-7 cent-a-mile bonus, depending on the difficulty of the route. Bonuses were doubled at night, when the hazards increased several-fold).

The typical air mail plane in the pioneer stage was an open cockpit deHavilland biplane, with an unreliable compass and little else in the way of navigation instruments. The pilots relied on their instincts, and counted heavily on the airfield attendant when the chips were down.

On July 1, 1927, after seven years of regular air mail service, the Post Office turned over the job of maintaining ground support for the planes to the Department of Commerce. At the time of transfer, more than two-thirds of the 2,665-mile Transcontinental Airway was lighted. The lights consisted of 5,000 candlepower acetylene gas beacons or blinkers spaced three miles

apart. Most of these beacons had course lights—green denoting that an airfield was nearby, red indicating no field. The course lights were also coded in dots and dashes, so that a pilot could tell how far he was from the nearest terminal.

Emergency airfields were located about every 25 miles. A rotating 18″ or 24″ beacon, mounted on a 50 foot tower, flashed its welcome signal over the darkness, easing the burden of night-flying the mail.

Ground personnel of the system in 1927 consisted of 45 radio operators, 14 maintenance mechanics and 84 caretakers. An "airway radio station" was located at each of the 17 terminals, and there were also a number of intermediate "airway keeper stations" with low-power radio marker beacons. The entire operation was administered by the Lighthouse Service of the Department of Commerce.

Many of the airway keeper stations west of Omaha were located in desolate wilderness country or on high mountain passes accessible only by mule train. Bitter Creek and Cherokee, in Wyoming; Locomotive Springs, in Utah; Beowawe and Buffalo Valley, in Nevada, and Donner Summit in California were typical station sites. At Donner Summit (alt. 7,100 feet) the tower and radio shack had to be anchored to solid rock in order to keep them from being blown away by fierce winds of the high Sierras; often the station keepers were snowbound for months.

Maintaining a remote station called for a high degree of ingenuity, a tolerance for isolation—and at times the agility of a mountain goat. Skis, sleds and snowshoes were standard operating equipment during the long winter seasons. Shelter consisted of a prefabricated wooden hut, drab and drafty and furnished strictly for utility, housing one to four men at a maximum annual outlay of about $12,000—which included salaries and supplies. A good huntsman was always a welcome addition to the complement.

Improving Safety Record

Lighting the airway and extending the radio capability had a favorable effect on flight safety from the very beginning. The 1919 fatality ratio of one pilot killed for every 114,324 miles of airmail flight was reduced to one fatality per 2.5 *million* miles by 1926. The accident rate continued to decline, as the ground support system was extended, until the calamitous year of 1934, when accidents temporarily increased as inexperienced military pilots were abruptly called upon to fly the mail.

In 1938 the airway radio station was redesignated as "airway communication station", under the newly created Civil Aeronautics Authority (later the Civil Aeronautics Administration of the Department of Commerce). By this time, thanks to air-to-ground radio capability, station operators could actively participate in the control of a flight in progress, giving the latest weather reports and helping lost pilots identify local landmarks and find their bearings.

Airways maintenance technician "Dusty" Rhodes takes a break alongside his sector truck in the late '30s. Unlike their modern counterparts, the airway station keepers of 40 years ago were required to wear distinctive uniforms on the job.

The term "flight service station" came into use after the creation of the Federal Aviation Agency in 1958, and has continued to the present day, when FAA is the Federal Aviation Administration of the Department of Transportation.

Today, the flight service station network covers all of the fifty states and reaches out to Pago Pago, Wake Island and Guam in the Pacific, to Panama and to the Caribbean. There are 340 stations, including nine international stations, staffed by about 4,600 flight service station *specialists*. All stations are closely linked to FAA's nationwide air traffic control system by radio and teletype and many are equipped with direction finding equipment that enables them to steer lost aircraft home by means of signals from the aircraft's radio. The stations also serve as the nucleus for an air-to-ground communications and electronic navigation system that extends for several hundred miles in all directions. They are staffed by as many as 110 persons, although some (primarily in Alaska) have less than half a dozen men.

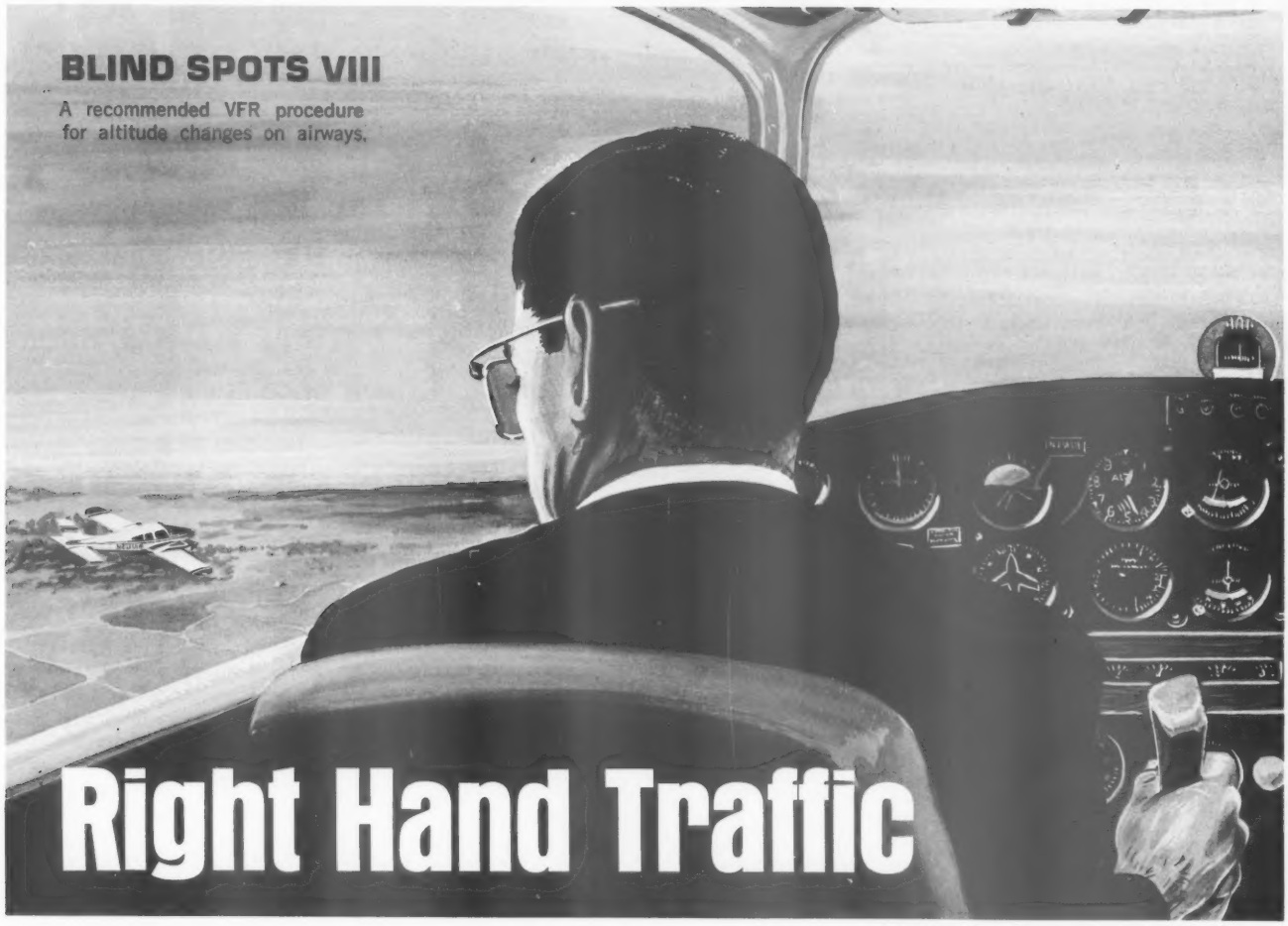
Flight service stations are no longer remote, as were their predecessors, and they are no longer oriented toward the air mail alone. They are located at selected airports where they contact an average of 30,000 private and business pilots daily, providing them with the latest weather reports and other flight data that help make flight safe and pleasant. They process flight plans which assure pilots of inflight separation from other aircraft and of prompt follow-up activity in the event of an overdue arrival. They provide periodic weather broadcasts round the clock (most stations remain open 24 hours a day) and keep a watchful eye on their far-ranging communications and navigation network. They respond to inflight emergencies, leading crippled aircraft or lost pilots to safety (1,452 lost "sheep" were assisted by FSS in 1969).

Pioneer Days Are Over

Today's flight service station specialist is no longer required to lead the rugged pioneer life of his predecessors in the airway radio stations. He lives in a comfortable home of his own, instead of a mail order prefabricated hut on a mountain top, works varying eight hour shifts and is paid well. He no longer risks his life helping prop balky engines on frozen fields, or riding in the mail compartment of open biplanes, but his dedication to the safety of pilots who seek his assistance is as strong as it was half a century ago, when the age of flight tottered forward in the form of the United States Air Mail Service. His day-to-day work is not as dramatic as it once was, nor as widely appreciated by the public, since he does not direct or regulate air traffic.

But nevertheless he is the person most pilots rely on for flight planning data, for guidance over unfamiliar terrain, for steady reassurance when they get into trouble. No one who has ever been caught in a light plane in a violent thunderstorm, or become disoriented in fog over hazardous terrain, or run out of fuel in pitch darkness, can forget what it is to hear a calm, steadying voice on the radio receiver leading him out of agonizing uncertainty and down to the firm green earth. Airplane "accidents that didn't happen" seldom make headlines or heroes, but the men and women of FAA's flight service stations can live without either. They get a very warm feeling from knowing they have helped someone get home safely, whether he be a friend, a neighbor, or a stranger passing overhead in the night. ▪

Specialists at Morgantown, W. Va., Flight Service Station, one of the most modern in the FAA, use a direction finder, broad communications network, plus knowledge of their own area, to locate lost pilot.



BLIND SPOTS VIII

A recommended VFR procedure for altitude changes on airways.

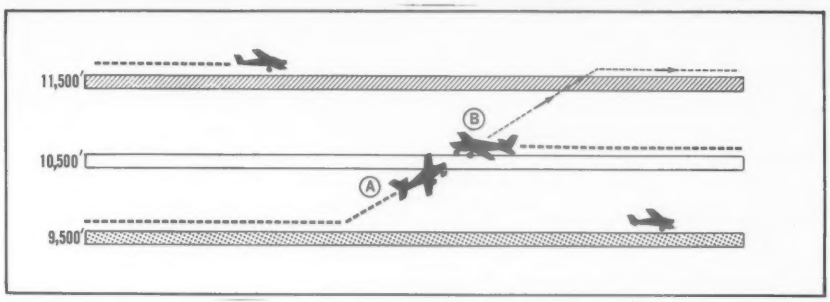
Right Hand Traffic

Most pilots make use of VORs in cross country flights, but many VFR pilots may not realize when or where they are traveling within the controlled airspace of an airway. An airway may be defined as airspace along a designated radial leading from one NAVAID to another, approximately eight miles in width. The airway begins at 1,200 feet above ground (unless otherwise specified on the chart) and terminates at 18,000 feet.

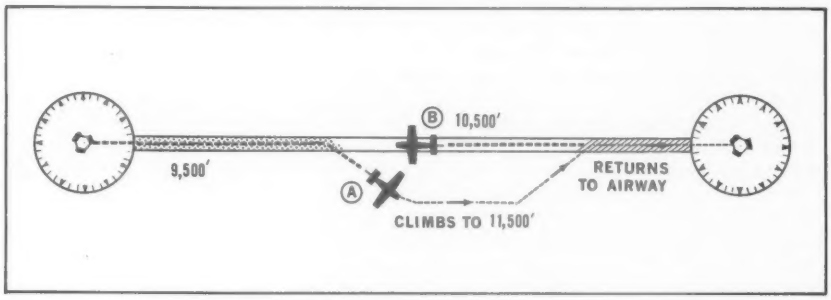
While IFR traffic on airways are provided separation from each other by Air Traffic Control, VFR flight is given no such protection, although such flight is perfectly legal and safe as long as weather conditions permit.

Every pilot must realize, however, that since traffic tends to be relatively heavy within the confines of certain airways, the importance of looking out for other VFR or IFR aircraft is vital. This is especially true when changing altitude, since during climb or descent his wing or fuselage could block his view temporarily.

To avoid the possibility of a midair collision on an airway, VFR pilots are advised to fly to the right side of the radial forming the airway when changing altitude. After leveling off, the needle can be "flown to" and centered again. ■



A potentially dangerous situation exists when a VFR aircraft changes altitude on an airway. Unknown traffic, either VFR or IFR, may be hidden by portions of his wing or fuselage during climb or descent. A detour off the airway to the right will help clear the air for safer maneuvering. Airways near large cities are heavily used.



Famous FLYERS

Above—"Slim" Lewis flies a DH-4 mail plane over Iowa on the Transcontinental Airway. **Below**—DeHavilland-4 takes aboard standard 400-pound load of mail which was stowed in modified front cockpit. **Right**—Jack Knight at Checkerboard Field, Chicago, after his history-making night mail flight, February 22-23, 1921. He flew alone from North Platte to Chicago.

"Neither snow nor rain . . . nor gloom of night . . ."

stayed this courier from the swift completion of his appointed rounds.

The NIGHT the Mail Went Through

Despite the bulk of his fur-lined "teddy bear" flying suit, Jack Knight was shivering in the open cockpit of his World War I surplus DH-4. He was flying at 2,000 feet above the snow drifted Nebraska plain, an hour out of North Platte, enroute to Omaha 276 miles to the East. The cold penetrated to his bones, knifing through the layers of newspapers he had slipped between his flying suit and his double layer of wool underwear.

Below him no lights or landmarks were visible as the new moon raced behind an almost solid cloud cover. Soon fresh snow added to Knight's problems; the DH-4's skimpy windshield afforded small relief as the whirling wind piled up white drifts around him. His heavy goggles chafed against his nose, broken the week before when he had crashed into a mountain in the Laramie Range trying to fly the mail through another snow storm.

Alternately now he sat on one heavily gloved hand and then the other, trying to bring a touch of warmth to numb fingers, while he held the bucking control stick in place. Despite the fur-lined boots his feet ached with cold so badly that he could hardly feel the rudder bar.

Before this night was out Jack Knight and a small group of early-day pilots and flight service station attendants (then called "airway stations—see p. 7) would prove that around-the-clock air mail flight was possible under the worst of conditions. Knight was on his lonely mission on the night of February 22-23, 1921, the date the Post Office Department chose to convince Congress that a transcontinental air mail service was practical. By a series of connecting flights letters were dispatched to span the continent, hopefully, in a little more than 24 hours, instead of the 90 hours required by train.

Coast-to-coast (New York to San Francisco) mail flights had been in operation since September 8, 1920, following the establishment of 17 Post Office airfields with radio or caretaker ground stations.

The station attendants also were the custodians of simple airport lighting, which included in some cases whatever combustibles —oil tanks, railroad fusees etc.—were at hand, to be ignited when the roar of the DH-4, Liberty engine boomed out in the night or overcast.

The early transcontinental airmail service had skimmed along on thin ice from the very beginning. Accidents were common, many of them fatal, weather-delayed air mail often took longer than train mail, there was no means of navigating after dark. Aircraft would move the mail from point-to-point as long as the light held, but at nightfall the mail had to be trucked to express trains or lie idle until dawn.

How could the Post Office justify the lavish outlay for planes, pilots, and airfields?

Congress was just about to swing its appropriations knife, slashing the airmail service entirely out of the upcoming budget, when Post Office officials hurriedly decided to prove the airmail's worth by sending two planeloads of mail across country in both directions in a continuous flight.

Bad weather and an erratic engine brought down both of the west-bound planes less than an hour out of New York, placing the entire burden of the experiment on the shoulders of the two east-bound planes. Here, too, misfortune struck early.

From San Francisco, pilots Farr Nutter and William "Cap" Lewis took off at 4:30 in the predawn darkness enroute for Elko, Nev. Nutter landed first, and turned to watch Lewis' approach—only to see him suddenly plunge out of control and crash to his death before the horrified gaze of scores of onlookers gathered to watch the historic flight.

Second-leg pilot Jack Eaton, who also witnessed the crash, took Nutter's mail to Salt Lake City where it was loaded aboard "Jimmy" Murray's waiting DH-4. Murray's route took him over the Continental Divide, past Rawlings and Medicine Bow to Cheyenne, where 400 pounds of mail were transferred to Frank Yeager's waiting DH-4. Yeager kept the prop turning over to prevent the engine oil and the radiator water from freezing in the near zero weather.

Yeager's route lay across the flat plateau to Sidney, Neb., then over the oblong lake formed by the North Platte River near Ogalla. At North Platte, a broken tail skid took three hours to repair, and it was after 10 p.m., when James H. "Skinny" Knight took off for Omaha.

He had made the trip many times before in daylight, and his aviator's "black book" listed every church steeple, livery stable, crossroad, bridge, town, and farm enroute. No significant detail was left out, including the names of farmers with phones and attractive daughters. But the darkness and the snow erased his visual references.

Fortunately, the flight had been widely publicized and as Knight ground along at 110 mph, the throaty roar of his straight-stacked 12-cylinder, 400 hp Liberty engine sent people on the ground hurrying to light bonfires to mark his path. He gunned his engine in response and thanks.

Dead reckoning and bonfires led Knight to Omaha where a blizzard raged as he

searched for the field. Suddenly there was a glow ahead—the faithful station crew, despite the knowledge that Knight was more than three hours overdue, had lingered on, just in case. They touched off a row of oil filled cans to light the runway borders.

Knight found no relief pilot in Omaha. The day/night flight test had been considered weathered out by the ferocity of the midwest storms.

Knight decided otherwise. Refueling his DH-4, and pouring heated oil into the engine and boiling water into the radiator, he was off in the snow at 2 a.m. for Chicago via Des Moines, navigating by a road map. At Des Moines he found the snow too deep for him to land, even if he could locate the field, which he could not. The nearest air mail field was at Iowa City.

Knight turned for Iowa City with only a marginal 20 minutes of fuel remaining. As the last of his fuel was spraying through his carburetor he spotted the orange-red light of a railroad fusee ahead in the blackness, held by the field watchman.

Knight was told at Iowa City that his relay pilot was tucked snugly into his bed. Skinny grimly resolved to fly the mail to Chicago himself. Once more the DH-4 was refueled and readied for flight. The watchman trudged through the snow to the far end of the field and set out a row of fusees for Knight to aim at.

Airborne for the third time that night, Knight set his course for Chicago, compensating for a 25 mph quartering wind. The snow abated, only to be replaced by dense, ground level fog. Now he could not resort to the airmail pilot's favorite trick of hedge-hopping below cloud cover. Knight climbed above the fog, using its top as a horizon, hoping the dawning sun would burn off the vapor before he became hopelessly lost, perhaps out over Lake Michigan. Luck was with him—he was able to follow the shortline south to Chicago.

To his surprise, he was met by a crowd as he landed at Chicago's Checkerboard Field. Word of his progress had been flashed across the airway's radio-telegraph network and from there to the public via commercial radio broadcasts. Jack Knight was a national hero.

His mail was shifted to another DH-4, piloted by Jack Webster to Cleveland, and by E. M. "Ernie" Allison to New York, arriving at Hazelhurst Field at 3:30 p.m., February 23, 1921. The nation had been spanned by a day/night airmail service in little more than 24 hours, thanks in large measure to the stubbornness of a pilot who did not know when to quit. Impressed, Congress approved the continuation of the air mail service and the start on the world's first airway lighting system.

Jack Knight's refusal to quit flying on that critical night in 1921 altered the course of aviation history. ■

Pilot BRIEFS

■ "SMALL" AIRCRAFT WITH NINE OR MORE PASSENGER SEATS would be required to meet the more stringent transport category airworthiness standard for type certification under a rule change proposed by FAA. Details in the September issue.

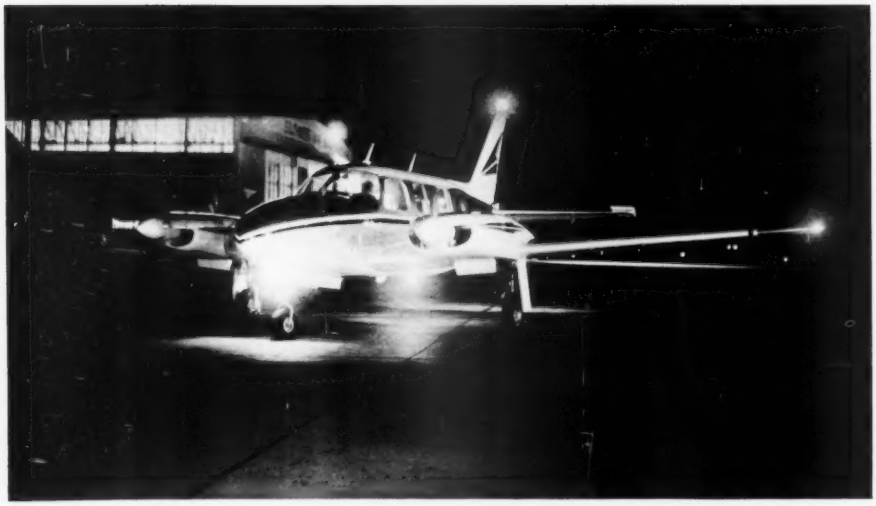
■ VFR TRANSPONDER CODES CHANGED. CODES 3300, 3400 and 3500 have been dropped as VFR identification codes, effective July 1, 1970. VFR pilots flying below 10,000 feet should squawk 1200; at or above 10,000 feet squawk 1400. Code 1400 will also be used on ATC clearances specifying VFR conditions on top or when an aircraft cancels an IFR flight plan to go VFR.

■ NOTAM ON NOTAM CHANGE. All domestic Notices to Airmen are now transmitted in "plain English" by means of easily understood standard contractions. For example, under the new system pilots could be informed that on September 1 the glide path of the instrument landing system at Washington National is to shut down from 6 am until 9 pm as follows: DCA 9/1 GP OTS 06-2100. Subsequent NOTAMS would give a progress report in the same contracted language.

■ TIME FLIES—WILL YOU? Approximately 55,000 aircraft owners failed to meet the June 30 deadline for filing the new FAA "Aircraft Registration Eligibility, Identification and Activity Reports" form. Failure to submit the form on time could result in suspension or revocation of the registration certificate. AC-Form 8050-73 can be obtained from FAA District Offices, Area or Regional Offices.

■ HASTE WITHOUT WASTE. The advent of the 747 has sharply increased the available airline seats for passengers traveling to Europe via uncrowded Dulles International Airport. Four international carriers (Pan Am, TWA, BOAC and Air France) now offer more than 1,000 seats daily on direct flights to London and Paris. Well over 100,000 travelers flew to Europe from the Washington, D.C. jetport in the first half of 1970.

■ JOHN Q. PILOT, WHERE ARE YOU? Several months ago FAA sent a letter to more than 600,000 U.S. registered pilots which carried a safety message from Administrator John H. Shaffer. But 50,000 of those letters made a round trip back to FAA, stamped "Address Unknown." FAR 61.51 states that "Within 30 days after any change in his permanent mailing address, the holder of a pilot or instructor certificate shall notify the FAA Airman Certification Branch, Oklahoma City, Okla., 73125, in writing, of his new address." Failure to do so could result in a civil penalty or an order amending, suspending or revoking the certificate.



Night-flying aircraft in all weight categories would have to be equipped with approved anticollision lights under a proposed rule now open for comment. The proposal also specifies increased candlepower of the lights but gives owners an option between red or white lights.

Changes Sought in Anticollision Light, Drinking Rules

All powered aircraft operating in the U.S. would be equipped with approved anticollision lights for night operation under a proposed rule now being circulated by FAA in the aviation community. Owners of existing aircraft would have a year's grace to equip their planes with the lights, following final adoption of the proposal.

Anticollision lights are now required on aircraft weighing more than 12,500 lbs., and on all aircraft certificated for night operations since 1957. Only red lights are now permitted under present rules.

The proposed anticollision lights could be either flashing aviation red or aviation white at the owner's option. The proposal also calls for increasing the effective intensities of anticollision lights. Present intensities range from 10 to 100 candles, depending upon the angle above or below the horizontal plane of the aircraft. Under the proposal, these intensities would be increased to 40 to 400 candlepower, respectively.

Another FAA proposed rule seeks to amend FAR 91 to prohibit any person from acting as a crew member of a civil aircraft within eight hours after consuming alcoholic beverages.

The existing law merely provides that "no person may act as a crew member of a civil aircraft while under the influence of intoxicating liquor." Airlines have their own much more stringent rules concerning alcohol consumption by their aircrews prior to flight.

National Transportation Safety Board statistics show that alcohol plays a significant and disproportionate role in general aviation accidents.

In 1967, there were 83 alcohol-involved fatal accidents; in 1968, 91 alcohol fatal accidents were found; in 1969 there were 63 alcohol-involved fatal accidents.

Deadline for comment on the anticollision light proposal (Docket 10129; Notice 20-21) is Sept. 2, 1970. Deadline for comment on the proposed amendment to FAR 91 (Docket 10077; Notice 70-22) is Sept. 10, 1970. Comments should be submitted in duplicate and sent to the Federal Aviation Administration (GC-24), 800 Independence Ave., S. W., Washington, D. C. 20590.

New Airworthiness Directives Summary on Sale

The 1970 edition of the "Summary of Airworthiness Directives", containing all FAA directives issued prior to Jan. 1, 1970, is now available in two volumes.

The "ADs" are available only through the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. Volume I (small aircraft) costs $5; Volume II (large aircraft) costs $5.50. For foreign mailing, an additional 25 per cent is required to cover postage.

Supplements to the Summary will be made biweekly distributed directly from FAA's Aeronautical Center at Oklahoma City. Only those persons returning the postal card attached to the summary will receive the supplements.

Registered owners of aircraft will continue to receive ADs for their particular aircraft.

ADAP Schedules $30 Million For General Aviation Airports

General aviation airports will have an annual appropriation of $30 million available as matching grants for the next five years under FAA's new Airport Development Aid Program (ADAP).

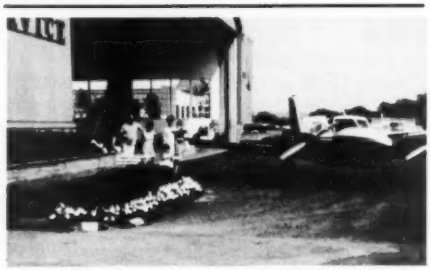
Eligible projects for which the agency will generally pay 50 per cent of the cost include runways, taxiway and apron construction, runway and taxiway lighting, and land for current and future airport development. Excluded are hangar and terminal construction.

The new program also authorizes expenditure of $250 million annually for airports served by air carriers and for airports designated as "relievers", requiring better general aviation facilities. The program provides $15 million annually for grants to assist planning and public agencies in formulating aviation system and airport master plans. The funds will be derived from increased fuel, freight and passenger taxes, and from aircraft registration fees.

Under Department of Transportation policy the program includes a number of new requirements that must be satisfied before a request for funds is made. For example, if planned airport construction involves displacement of persons, the request for funds must be accompanied by assurance that adequate replacement housing is provided for.

Similarily, requests for ADAP assistance will not be considered unless the sponsoring public agency certifies that citizens in the area where construction includes a new airport, a new runway or any expansion have been afforded an opportunity to express their views at a public hearing. Specifically mentioned in the ADAP program as topics for open discussion are the social, economic, and environmental effects resulting from this type of airport construction.

Requests for financial aid under the ADAP program should be directed to FAA's Area or District Office nearest the proposed airport site.



FLORA ON THE FLIGHT LINE. Flower power brightens the hangar front at Empire Aero Services Airport, Skaneateles, N.Y., recent winner of FAA's Airport Beautification Award. Hangar renovation also played a part in the award earned by Philip Billard Municipal Airport, Topeka, Kan. (not shown).

FAA Aviation News welcomes comments from the aviation community. We will reserve this page for an exchange of views. No anonymous letters will be used, but names will be withheld on request.

• Up, Where the Air is Thin

I wish to thank FAA and the Air Force for making available to general aviation pilots the one-day course in physiological and high-altitude oxygen equipment training. My son and I attended the course last week at Westover AFB.

Robert M. Messner
New York, N. Y.

Pilots interested in taking the one-day high-altitude and physiological training course may obtain details by writing to: Physiological Operations and Training Section, AC-143, Civil Air Medical Institute (CAMI), FAA Aeronautical Center, P. O. Box 25082, 6400 S. MacArthur Blvd., Oklahoma City, Okla. 73125.

• Not Getting the Magazine?

I moved recently, and sure enough my FAA AVIATION NEWS stopped coming, even though I sent you a change of address notice weeks ago. What gives?

James G. Riddlehouse
Arkansas

To change the address for your subscription to FAA AVIATION NEWS you should write to the Mail List Section, P. O. Box 1533, Washington, D. C. 20013. Include a magazine subscription label showing the old address together with the new address and ZIP code printed clearly. Allow two to three weeks for processing a new mailing plate.

Do not send change of address to FAA AVIATION NEWS *office. This will only cost you time, while the request is forwarded by mail to the address above.*

Incidentally, inquiries regarding delays in subscriptions to the magazine arriving should be sent to CUSTOMER SERVICE SECTION, Superintendent of Documents, P.O. Box 1533, Washington, D.C. 20013.

• TCA and All That

Your mentioning the revised Notice of Proposed Rule-Making 69-41B in the April, 1970 issue—noting that the deadline for comments on the proposed rule was April 24, 1970—an issue which I received only on *May 7, 1970,* proves to me that you are abetting FAA management's desire to prevent response by general aviation to a rule which obviously discriminates against them. I am now convinced, also, that the omission of TCA from your September or October, 1969, issues was *not* to avoid controversy in your pages, but to *keep general aviation in the dark.*

Dr. J. Peter Vajk
Livermore, Calif.

The Terminal Control Area proposal (TCA) was discussed fully in the November, 1969, issue of FAA AVIATION NEWS. The April issue, containing the revised Notice 69-41B, was published on March 30, and normally would have been in the hands of all subscribers by mid April. We sincerely regret the late arrival of your magazine, and will forward your complaint to the Superintendent of Documents, who handles shipments.

• Freqing Out Loud

Which frequency should I monitor—122.8, the standard UNICOM frequency, or 123.5, generally associated with flight training?

The operator of the field from which I fly requires all pilots, students and licensed alike, renting his planes, to monitor 123.5 MHz. However, he himself does not normally monitor 123.5 MHz on the ground, and utilizes this frequency only to make calls to his flight instructors, etc. Transient aircraft are probably unaware that some aircraft are monitoring 123.5 MHz only and are not listening on UNICOM 122.8 MHz.

Transient pilots are led to a false sense of security and there is no great amount of security for me, all alone on 123.5 MHz, receiving no traffic information at all. It seems there is potential problem brewing here.

Concerned
Rockville, Md.

From the information you have given us it appears that itinerant pilots would learn the traffic situation by tuning 122.8 MHz and inquiring. The operator may then inform users of his planes of itinerant traffic he thinks they should know about on 123.5 MHz.

Recommended procedures for exchanging traffic information at non-tower airports are described in the Airman's Information Manual and in FAA Advisory Circular 90-42.

We have sent you a copy of AC 90-42 which you might post as a diplomatic suggestion to your airfield operator.

• Short Time IFR Pilot

I was 35 miles southeast of the Newcombe, W. Virginia VOR at 9,500 heading for Greer, S.C., when I spotted some large build-ups of cumulus south of me and I asked Huntington FSS for weather enroute. I was quickly advised that there were thunderstorms over the mountains and told to do a 180° and get back to Huntington.

As I started to turn, the sunlight glaring into the haze completely blocked out visual reference to the ground. I had entered IFR conditions momentarily without realizing it. The FSS specialist skillfully guided me downward and I was soon out of the haze. Now I am among some hundreds of other pilots with special high regards for the skill and dedication of FSS crews.

Lance Devon
Southgate, Mich.

• Procedure Turns and Holding Turns

If a pilot is told to hold at an outer marker with no specific instructions from the controller, and the approach chart shows a non-standard procedure turn—for example, procedure turn outbound to the right—is it permissible to hold on the opposite side in a standard right turn holding pattern?

Is this what ATC expects, and will this allow minimum safe altitude clearance provided the chart has no stated restrictions for holding on this side?

W. H.
Anchorage, Alaska

There is no requirement that the direction of a depicted procedure turn on an approach chart relate to the direction of holding pattern turns for a particular fix. If a delay is anticipated and the holding pattern is not charted the controller is required to issue general holding instructions or, if the pilot requests or the controller considers it necessary, detailed holding instructions.

General holding instructions include the direction of holding pattern turns, if left turns are to be made. In the absence of specific turn instructions right-hand turns are to be made. In any case, if you have any doubt as to the holding procedure you are to follow, request instructions from ATC.

• Corridors in the Sky

In the March FAA AVIATION NEWS "Forum" you replied to a letter concerning climb/descent corridors by stating that the corridor concept, as suggested by AOPA and ALPA, will be designed for high-density terminal areas wherever suitable.

This is categorically not so; it is the agency's position that the corridor concept will not be implemented because it will result in exceptions being made to the master TCA (terminal control area) plan.

The aviation interests here in St. Louis warmly endorse the corridor concept and have gone to a great deal of time, effort, and expense to prepare drawings, mock-ups, and scale models to display the kind of TCA the economic interest in this area could live with.

John C. Mosby, Jr.
St. Louis, Mo.

The corridor concept endorsed by local aviation interests has not been summarily discarded. See "TCA and the VFR Pilot", page 3 of this issue.

• Demon Rum and the Pilot's Image

In my opinion your cartoon on the back of the May FAA AVIATION NEWS was in poor taste and showed a gross lack of professionalism by depicting a pilot pulling on a bottle accompanied by a caption urging us pilots not to drink and fly.

Larry L. Robbins
Kansas City, Mo.

The statistics on alcohol involvement in fatal accidents are sobering. See the news article on this subject, page 14.

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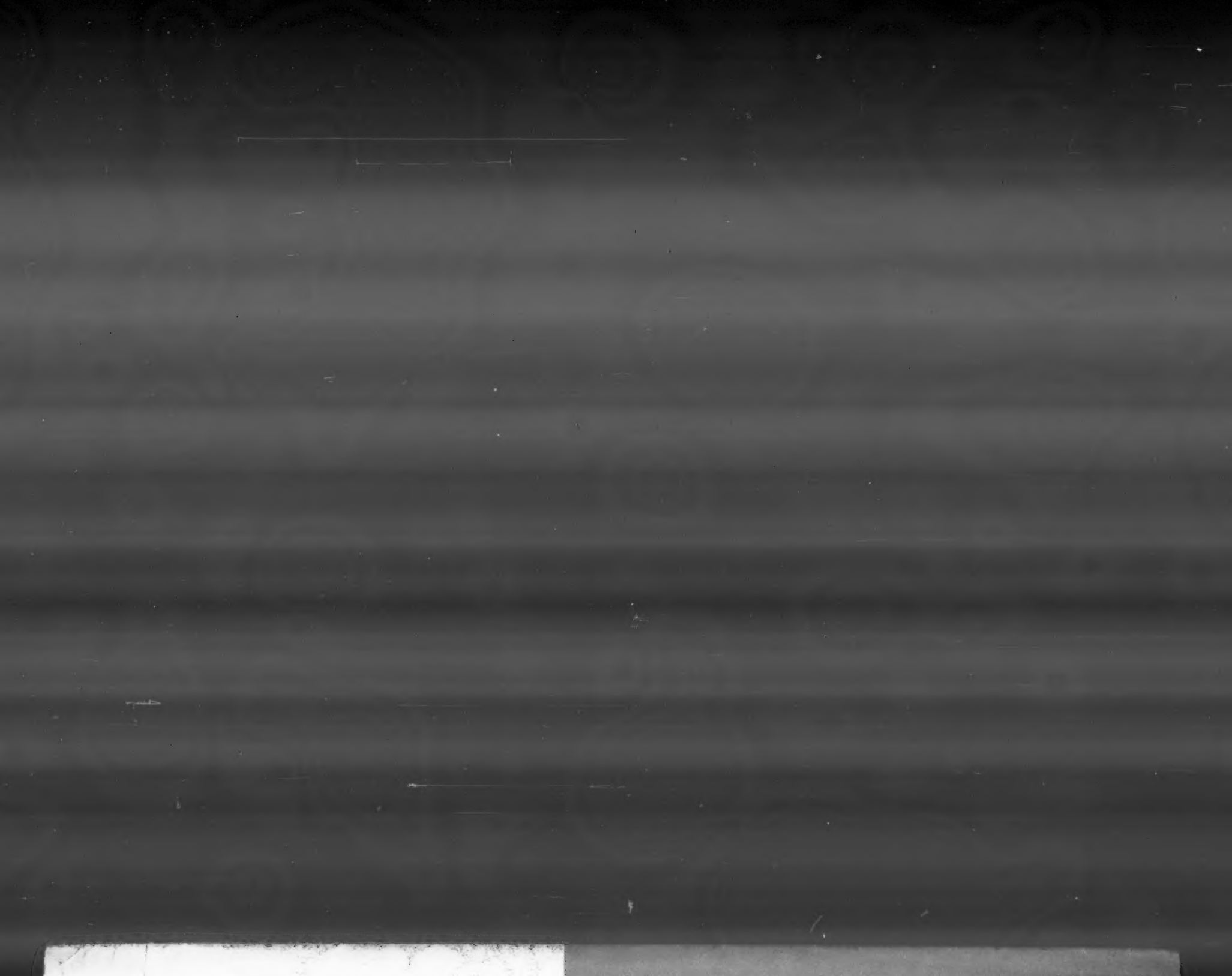
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